

**Amendments to the Drawings**

The attached sheet of drawings includes changes to Fig. 4. This sheet replaces the original sheet of drawings.

Attachment: Replacement sheet

### **Remarks**

Reconsideration of the application is respectfully requested in view of the foregoing amendments and following remarks. Claims 1-17 are pending in the application. No claims have been allowed. Claims 1, 4, 7, 10 and 14 are independent. Claims 15-17 are new.

### **Cited Art**

The Office action ("Action") applies the following cited art: U.S. Published Patent Application No. 2005/0159940 to Wu et al. ("Wu").

The prior art made of record and not relied upon, but which is considered pertinent, is as follows: U.S. Patent No. 6,219,458 to Zandi et al. ("Zandi").

### ***Telephonic Interview***

Applicants wishes to thank the Examiner for extending a telephonic Examiner Interview on September 6, 2007. Although specific agreement was not reached, Applicants thank Examiner for his time and suggestions.

### **§ 102 Rejection**

The Action rejects claims 1-14 under 35 U.S.C. § 102(e) as being anticipated by Wu. Applicants respectfully submit that the claims are allowable over the cited art. To establish a prima facie case of anticipation, the cited art must show each and every element as set forth in a claim. MPEP § 2131.01.

### **Claim 1.**

Amended claim 1 reads:

1. (currently amended) A method for lossy compression of at least a portion of an input audio signal, and lossless compression of at least a second portion of the input audio signal, the method comprising:
  - encoding a frame of the input audio signal using lossy compression based on a lapped transform as a lossy frame;
  - determining compression performance for the lossy frame;

if the compression performance of the lossy compressed frame fails to meet an acceptable compression performance criteria, encoding the frame as a mixed lossless frame via a coding processing comprising:

1) processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame to produce a processed frame, and

2) losslessly compressing the processed frame;  
determining compression performance for the mixed lossless coded frame;

and

outputting better performing of the lossy frame or the mixed lossless frame.

Applicants respectfully submit that Wu neither teaches nor suggests, at least, the following amended claim 1 language.

- A method for lossy compression of at least a portion of an input audio signal, and lossless compression of at least a second portion of the input audio signal,
- determining compression performance for the lossy frame;
- if the compression performance of the lossy compressed frame fails to meet an acceptable compression performance criteria,
- encoding the frame as a mixed lossless frame via a coding processing,
- processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame,
- losslessly compressing the frame;
- determining compression performance for the mixed lossless coded frame; and
- outputting better performing of the lossy frame or the mixed lossless frame

Wu applies to Lossy compression techniques only. [Wu, ¶11, (“The invention includes a method and system for minimization of quantization-induced block-discontinuities arising from lossy compression...”)] Specifically, Wu discusses minimizing lossy quantization error in audio compression by providing a “signal and residue classifier” that splits each transformed frame into two separate components: signal and residue (the error from reconstruction, that is, the original signal minus the reconstructed signal). The signal and the residue are then handled differently, but both are lossily compressed using slightly different methods, with the residue being compressed to a greater degree. [Wu, Fig. 2 (showing a Signal/Residue classifier splitting signal input into Signal and Residue), ¶¶55-60 (explaining splitting the signal input and the

separate paths taken by the Signal and Residue), ¶58, saying “While the strong signal components are coded **more rigorously** using ASVQ, the remaining residue is treated differently in the preferred embodiment.” (emphasis added.)] The residue is modeled as “bands of stochastic noise.” This is not a lossless compression method. Rather, the compression just attempts to reconstruct the amplitude or energy in each stochastic band, and not the actual signal. [Wu, ¶¶58-60.] Further, the methods of Wu only work with lossy compression methods, as they reduce “quantization-induced block-discontinuities arising from lossy compression and decompression....” Such discontinuities do not exist in lossless compression methods. [See, e.g., Wu, ¶32, “If the quantization in question is lossless, then the residue is zero for each block, and no discontinuity results.”] As Wu discusses reducing quantization-induced block discontinuities that only arise during lossy compression, Wu teaches away from using lossless compression, as the problem that leads to the need for the Wu solution does not exist in such systems.

As Wu provides only for lossy compression, it does not teach or suggest, at a minimum, *lossy compression of at least a portion of an input audio signal, and lossless compression of at least a second portion of the input audio signal* as found in claim 1. Wu also does not teach or suggest *losslessly compressing the frame* as also found in claim 1.

Further, Wu does not determine compression performance for an individual frame. It splits an audio signal **within a frame** into signal and residue, but does not then determine compression performance for the lossy frame, as required by claim 1.

Wu also does not encode a frame as a *mixed lossless frame*, as each frame has exclusively lossy coding.

Wu also fails to *encode a frame of the input audio signal using lossy compression based on a lapped transform as a lossy frame...and losslessly compress the frame*. It is true that in Wu, a single frame may have a portion, the signal, encoded using one lossy compression method, and a second portion, the residue, encoded using a slightly different lossy compression method. However, the frame in Wu is only encoded once. Different portions are just encoded slightly differently.

Wu also does not teach or suggest *processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame to produce a processed frame*. In Wu, the residue is processed differently than the signal. In one embodiment, the residue is modeled as

“bands of stochastic noise,” and then in each band, random DCT coefficients are generated to match the original residue energy. Then, inverse DCT is performed to yield a time-domain residue signal. [Wu, ¶¶58, 59.] Wu, therefore, generates DCT coefficients and performs inverse DCT for a processed version of the residue-- a portion of a frame. However, only a portion of a frame is modeled, the residue, not “the frame,” and so teaches away from *processing the frame*. Further, modeling a residue as bands of stochastic noise and then generating random “DCT” coefficients does not teach or suggest a “lapped transform.” Random DCT coefficients are not “lapped.” Therefore Wu also does not teach or suggest the additional features *processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame to produce a processed frame*.

For at least the above reasons, claim 1 is in condition for allowance.

#### **Claims 2-3.**

Additionally, claims 2-3 depend from claim 1. In the interest of brevity, Applicants do not belabor the language of each of the dependent claims, but points out that they recite novel and nonobvious features allowable over Wu. Further, since they depend from claim 1, they should be allowed for at least the reasons stated for claim 1. Claims 2-3 should be allowable for at least the reasons given. Such action is respectfully requested.

#### **Claim 4.**

Amended claim 4 reads:

A digital signal encoder for lossy compression of an input signal, comprising:

- a lossy codec for encoding frames of the input signal using lossy coding based on a lapped transform;

- a mixed lossless codec operative when a frame of the input signal for which said lossy coding fails to meet an acceptable compression performance criteria, to encode the frame using another coding comprising processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame, and losslessly compressing the frame;

- a lossless codec operative when a subsequent frame of the input signal for which said lossy coding fails to meet an acceptable compression performance criteria, to encode the frame using another coding comprising losslessly compressing the frame.

Applicants respectfully submit that Wu does not teach or suggest, at least, the following amended claim 4 language.

- a mixed lossless codec operative when a frame of the input signal for which said lossy coding fails to meet an acceptable compression performance criteria, to encode the frame using another coding;
- processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame, and losslessly compressing the frame;
- a lossless codec operative when a subsequent frame of the input signal for which said lossy coding fails to meet an acceptable compression performance criteria, to encode the frame using another coding comprising losslessly compressing the frame.

Not to belabor the point, but using an analysis similar to that for claim 1, it can be seen that Wu fails to teach or suggest, at least, the above claim language. Claim 4, thus, is in condition for allowance.

#### **Claims 5-6.**

Additionally, claims 5-6 depend from claim 4. In the interest of brevity, Applicants do not belabor the language of each of the dependent claims, but points out that they recite novel and nonobvious features allowable over Wu. Further, since they depend from claim 4, they should be allowed for at least the reasons stated for claim 4. Claims 5-6 should be allowable for at least the reasons given. Such action is respectfully requested.

#### **Claim 7.**

Amended claim 7 reads:

A computer-readable medium having computer-executable software code carried thereon for executing on a computing device to effect a method for lossy compression of at least a portion of an input audio signal, and lossless compression of at least a second portion of the input audio signal, the method comprising:

encoding a frame of the input audio signal using lossy compression based on a lapped transform as a lossy frame;  
determining compression performance for the lossy frame;

if the lossy frame fails to meet an acceptable compression performance criteria, encoding the frame as a mixed lossless frame via a coding processing comprising:

- 1) processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame, and
  - 2) losslessly compressing the frame;
- determining compression performance for the mixed lossless coded frame;

and

outputting better performing of the lossy frame or the mixed lossless frame.

Applicants respectfully submit that Wu does not teach or suggest, at least, the following amended claim 7 language.

- determining compression performance for the lossy frame;
- if the lossy frame fails to meet an acceptable compression performance criteria, encoding the frame as a mixed lossless frame via a coding processing;
- processing the frame to effect the lapped transform and an inverse of the lapped transform of the frame;
- losslessly compressing the frame;
- determining compression performance for the mixed lossless coded frame; and
- outputting better performing of the lossy frame or the mixed lossless frame.

Not to belabor the point, but using an analysis similar to that for claim 1, it can be seen that Wu fails to teach or suggest, at least, the above claim language. Claim 7, thus, is in condition for allowance.

#### **Claims 8-9.**

Additionally, claims 8-9 depend from claim 7. In the interest of brevity, Applicants do not belabor the language of each of the dependent claims, but points out that they recite novel and nonobvious features allowable over Wu. Further, since they depend from claim 7, they should be allowed for at least the reasons stated for claim 7. Claims 8-9 should be allowable for at least the reasons given. Such action is respectfully requested.

#### **Claim 10.**

Amended claim 10 reads:

A method for mixed lossless compression of an input audio signal, the method comprising:  
    applying a windowing function to a frame of the input audio signal using an encoder to produce a windowed frame;  
    applying a lapped transform and its inverse transform which support perfect reconstruction on the windowed frame to generate a pseudo time domain using the encoder; and  
    losslessly compressing the pseudo time domain signal using the encoder; wherein the pseudo time domain signal is not in a frequency domain representation of the audio.

Applicants respectfully submit that Wu does not teach or suggest, at least, the following amended claim 10 language.

- applying a lapped transform and its inverse transform which support perfect reconstruction on the windowed frame to generate a pseudo time domain using the encoder; and
- losslessly compressing the pseudo time domain signal using the encoder; wherein the pseudo time domain signal is not in a frequency domain presentation of the audio.

Not to belabor the point, but using an analysis similar to that for claim 1, it can be seen that Wu fails to teach or suggest, at least, the above claim language. Claim 10, thus, is in condition for allowance.

#### **Claims 11-13.**

Additionally, claims 11-13 depend from claim 10. In the interest of brevity, Applicants do not belabor the language of each of the dependent claims, but points out that they recite novel and nonobvious features allowable over Wu. Further, since they depend from claim 10, they should be allowed for at least the reasons stated for claim 10. Claims 11-13 should be allowable for at least the reasons given. Such action is respectfully requested.

#### **Claim 14.**

Amended claim 14 reads:

A method for creating a pseudo time domain signal to switch the coding from lapped transform based codec to time domain codec for one or more particular frames;  
    applying a windowing function on the input audio signal to produce a windowed frame;



applying a lapped transform and its inverse transform on the windowed frame to generate a pseudo time domain signal; and  
using a time domain codec to losslessly compress the pseudo time domain signal.

Applicants respectfully submit that Wu does not teach or suggest, at least, the following amended claim 14 language.

- creating a pseudo time domain signal to switch the coding from lapped transform based codec to time domain codec for one or more particular frames;
- applying a windowing function on the input audio signal to produce a windowed frame;
- applying a lapped transform and its inverse transform on the windowed frame to generate a pseudo time domain signal; and
- using a time domain codec to losslessly compress the pseudo time domain signal.

Not to belabor the point, but using an analysis similar to that for claim 1, it can be seen that Wu fails to teach or suggest, at least, the above claim language. Claim 14, thus, is in condition for allowance.

#### **Claims 15-16.**

Additionally, new claims 15-16 depend from claim 14. In the interest of brevity, Applicants do not belabor the language of each of the dependent claims, but points out that they recite novel and nonobvious features allowable over Wu. Further, since they depend from claim 10, they should be allowed for at least the reasons stated for claim 10. Claims 11-13 should be allowable for at least the reasons given. Such action is respectfully requested.

#### **Support for New Claims and Amendments**

There is support for the new claims and amendments in the specification, claims, and drawings as originally filed. In addition, the following examples of support are given: e.g., Figures 4-7; the Specification at page 16, lines 14-16; page 18, line 3 to page 19, line 18; and at page 20, lines 7-16.

### **Request for Interview**

If any issues remain, the Examiner is formally requested to contact the undersigned attorney prior to issuance of the next Office action in order to arrange a telephonic interview. It is believed that a brief discussion of the merits of the present application may expedite prosecution. Applicants submit the foregoing formal Amendment so that the Examiner may fully evaluate Applicants' position, thereby enabling the interview to be more focused.

This request is being submitted under MPEP § 713.01, which indicates that an interview may be arranged in advance by a written request.

### **Conclusion**

The claims should be allowable. Such action is respectfully requested.

Respectfully submitted,

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